Sub B2 A3

12. ~~(Amended) A method of writing~~ an image to a liquid crystal display ~~comprising~~ the steps of:

providing an active matrix liquid crystal display ~~having~~ a plurality of pixel electrodes, a counterelectrode, and an interposed liquid crystal

setting a voltage to each pixel electrode;

allowing the liquid crystal to rotate towards an equilibrium;

flashing a backlight; and

~~initializing the pixel electrodes~~ to a set voltage.

Please add new Claim 18.

Sub B4 A-4

18. ~~(Now) The method of a backlight displaying an image of claim 1 wherein the step of~~ flashing a backlight commences prior to commencing of the ~~step of clearing~~ the image from the display and wherein the ~~step of clearing~~ the image from the display comprises the step of ~~varying the~~ voltage to the counterelectrode and the step of initializing the pixel ~~electrodes to a set~~ voltage.

REMARKS

Claims 1-18 are pending.

Claim 12 has been amended to correct a grammatical error. Claim 18 has been added and is dependent on claim 1.

The specification has been amended to correct typographical errors and to clarify the application.

Claims 1-7, 12, and 13 were rejected as being anticipated by Stewart, et al. (U.S. Patent No. 5,337,068). Claim 15 was rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart. Claims 14, 16, and 18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart in view of Ross (U.S. Patent No. 4,917,469). Claims 8-11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart in view of Kaneko (U.S. Patent No. 6,151,004).

Stewart is cited in the Office Action for disclosing a method of displaying an image comprising the steps of providing a matrix liquid crystal display, writing an image to the display,

clearing the image from the display, flashing a light source and repeating the steps of writing, clearing, and flashing to produce a second image. Figure 6 of Stewart is referenced for supporting this disclosure. Stewart is cited for several other disclosures in the Office Action including the step of clearing the image from the display comprising the steps of initializing the pixel electrode to a set voltage wherein figure 6 is once again referenced.

Stewart discloses a field sequential display system utilizing a backlight LCD pixel array, a method for forming an image. The backlighted color LCD display in Stewart is formed by placing a single matrix of liquid crystal devices over a bank of red, green, and blue flourescent lamps.

The Stewart patent states that a timing circuit controls a sequencing of lamps behind the LCD array and states in column 6 starting at line 1 that the reason for the sequence is because "pixel cells that are activated near the end of a frame interval, a sharper image is obtained when excitation of the lamps is delayed to match the activation of the line of pixel cells. This allows the pixel cells adequate time to stabilize before they block or transmit the light."

Stewart describes Figure 6 beginning at the bottom of column 11 at line 57 and states that

> Fig. 6 is a timing diagram which illustrates the relative time of the display drive signals, red, green and blue and the lamp drive signals red-drive, green-drive and blue-drive. As shown in the timing diagrams, each of the display drive signals occurs at a time significantly before its corresponding lamp drive signal. The delay between the display drive and the lamp drive signal allows for single propagation through the data circuitry . . . and allows for the time to charge the capacitor plate 258 and to reorient the liquid crystal material 234 beneath the plate 258. All of these events desirably occur before the lamp is flashed in response to the corresponding lamp drive pulse.

Of claims 1-7, 12, and 13 of the instant application, claims 1 and 12 are independent claims. In claim 1, the applicant claims a method of displaying an image comprising the steps of writing an image to the display and clearing the image from the display along with the step of flashing a light source. In claim 12, a method of writing an image to a liquid crystal display is claimed comprising the steps of setting a voltage to each pixel electrode; allowing the liquid crystal to rotate towards an equilibrium; flashing a backlight; and initializing the pixel electrodes to a set voltage.

While Stewart recognizes that the liquid crystal material does not rotate instantaneously and time is needed to allow the liquid crystal material to reorient beneath the capacitor plate, Stewart does not describe that the response time of the liquid crystal may be different going in one direction as compared to the other. Figure 10 of the instant application which is described beginning on Page 28 of the specification uses an example wherein the change of state from black to clear takes longer than when the liquid crystal is being driven from clear to black. (Both clear and white are used to refer to the same state of liquid crystal where light is capable of being transmitted or reflected through the liquid crystal.) With this recognition, the applicant further recognized that the additional step of clearing the image from the display prior to writing another image to the display decreases the time needed for the liquid crystal to response as the matrix liquid crystal display is written to and light flashed so that the user may see the image.

The specification starting on page 49 in describing Fig. 19C describes a method wherein the voltage of the counterelectrode is switched after the subframe (e.g., a subframe includes a writing and flashing for a single color, not the combination of writing and flashing for the three distinct colors), therein driving those pixels which were clear towards black and those pixels which were black towards clear. In addition, the voltage of the pixel is then set to the voltage of the counterelectrode, therein causing the liquid crystal associated with all the pixels to move towards the clear state. This is one method of clearing the image from the display and allowing when the next image is written to the display for the liquid crystal to respond or reorient more quickly.

While it is indicated in the Office Action that Stewart discloses through figure 6 the clearing of the image from the display as a separate and distinct step from the step of writing an image to the display, the undersigned fails to find such disclosure. The undersigned, therefore respectfully requests that the Examiner indicate where such disclosure is found within Stewart. Claims 1 and 12 are allowable.

Claims 2 -7 are dependent on claim 1 and are allowable, at least, for the reasons cited above. Claim 13 is dependent on claim 12 and allowable, at least, for the reasons cited above.

Furthermore, with respect to Claims 6 and 7, the undersigned fails to see where in Stewart it is disclosed the step of clearing the image from the display comprising the step of initializing the pixel electrode to a set voltage. Claims 6 and 7 are allowable.

Claims 14, 16, and 17

With respect to claims 14, 16 and 17, it is acknowledged in the Office Action that Stewart does not disclose sensing the properties of the liquid crystal. Ross is cited for teaching an LCD device with a sensor for sensing the liquid crystal. It is further stated in the Office Action that "it would have been obvious to one of ordinary skilled in the art to have modified Stewart with the features of temperature sensor as taught by [Ross] because the temperatures [sic] sensor can provide a feedback signal to stabilize the LCD without a temperature affect." Claims 14, 16, and 17 are dependent on claim 12 and are allowable, at least, for the reasons cited above. In addition, claims 14 and 16 recite not only sensing the property of the liquid crystal but heating the liquid crystal between frames when required. The step of heating is not discussed in the Office Action. Likewise, the undersigned was not able to find reference to heating of the liquid crystal within Ross or Stewart. Claims 14, 16, and 17 are allowable.

Claims 8 -11

With respect to claims 8 - 11, it is acknowledged in the Office Action that Stewart does not specifically disclose switching the applied voltage to the counter electrode panel after each subframe. Kaneko is cited for teaching an LCD device with a light source controlled similar to Stewart. Kaneko is further cited in the Office Action for disclosing "the two voltage levels are applied to the counterelectrode after every subframe." Figure 3 of Kaneko is cited in the Office Action to support this statement.

Kaneko discloses a color display system. The patent discloses a light source unit having a plurality of LEDs, each composed of three colors, red, green, and blue. The patent discloses in column 8 starting on line 14 that "the voltage of the common signal C supplied to the liquid crystal shutter unit 2 becomes c1 in the field f1 and c2 in the sub-field f2 [sic]." Contrary to what is stated in the Office Action, figure 3 shows the common signal being consistent for the entire field and not changing after every subframe such as between fR and fG and between fG and fB. The common signal is only changed from c1 to c2 from field f1 to field f2.

While the undersigned does not find within Kaneko the reason for changing the common signal C, it is contemplated a reason for such switching between frames, not subframes, is to help prevent a DC voltage from building up on the liquid crystal material such as described on page 16 of the instant application. While Kaneko shows switching the voltage after each frame,

Kaneko does not show the switching of the voltage to the counterelectrode panel after each subframe. The switching of the voltage after each frame, not subframe, does not clear the image as claimed and described in the instant application.

Claims 8 - 11 are allowable.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned at (781) 861-6240.

Respectfully submitted,

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By _____

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MARKED UP VERSION OF AMENDMENTS

Specification Amendments Under 37 C.F.R. § 1.121(b)(1)(iii)

Replace the paragraph at page 24, lines 3 through 10 with the below paragraph marked up by way of bracketing and underlining to show the changes relative to the previous version of the paragraph.

Referring to FIG. 5C, a Boron Phosphorus Silica Glass (BPSG) 134 of SiO_2 is formed over the circuit. A portion is etched away and an aluminum terminal 136 is added. Referring to FIG. 5D, a layer of Phosphorus Silica Glass (PSG) 138 of SiO_2 is formed over the BPSG 134 and the aluminum terminal 136. A titanium (Ti) black matrix 140 is located over the transistor as a light shield. A silica passivation 142 is formed over the entire wafer. The wafer is ready for the next assembly process.

Please replace the paragraph at page 50, lines 1 through 7 with the following paragraph:

It is recognized that modulating V_{COM} [on] or initializing can be done individually or in combination. It is desired to drive black first with LVV, also referred to as modulating V_{COM}, and set white with initialization. The combination allows for lower voltages and takes advantage of the fact that the response time driving white to black is quicker than the response time driving black to white.

Claim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

12. (Amended) A method of writing an image to a liquid crystal display comprising the steps of:

providing an active matrix liquid crystal display having a plurality of pixel electrodes, a counterelectrode, and an interposed liquid crystal

setting a voltage to each pixel electrode;

allowing the liquid crystal to rotate towards an equilibrium; [and]

flashing a backlight; and

initializing the pixel electrodes to a set voltage.